Reuse of Solid Wastes in Michigan

Duane Roskoskey. P.E.

Department of Environmental Quality

Resource Management Division

2012 Michigan Environmental Compliance Conference

Solid Waste Regulation

- Part 115, Solid Waste Management, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended
- Michigan's Solid Waste Management Act Administrative Rules
- Subtitle D of the Federal Resource Conservation and Recovery Act of 1976, as amended

Michigan Solid Waste Policy

- Views waste as a resource
- Challenges decision making based on the three principles of sustainability: economic vitality, ecological integrity, and improved quality of life.
- Stakeholder driven development process. Released in May 2007.
- Next Steps: Solid Waste Advisory Committee convened to guide implementation of Solid Waste Policy.

Why Recycle?

- ✓ Good For Economy
- ✓ Creates Jobs
- ✓ Reduces Waste
- ✓ Good for Environment
- ✓ Saves Energy
- ✓ Preserves Landfill Space
- ✓ Prevents Global Warming
- ✓ Reduces Water Pollution
- ✓ Protects Wildlife
- ✓ Creates New Demand

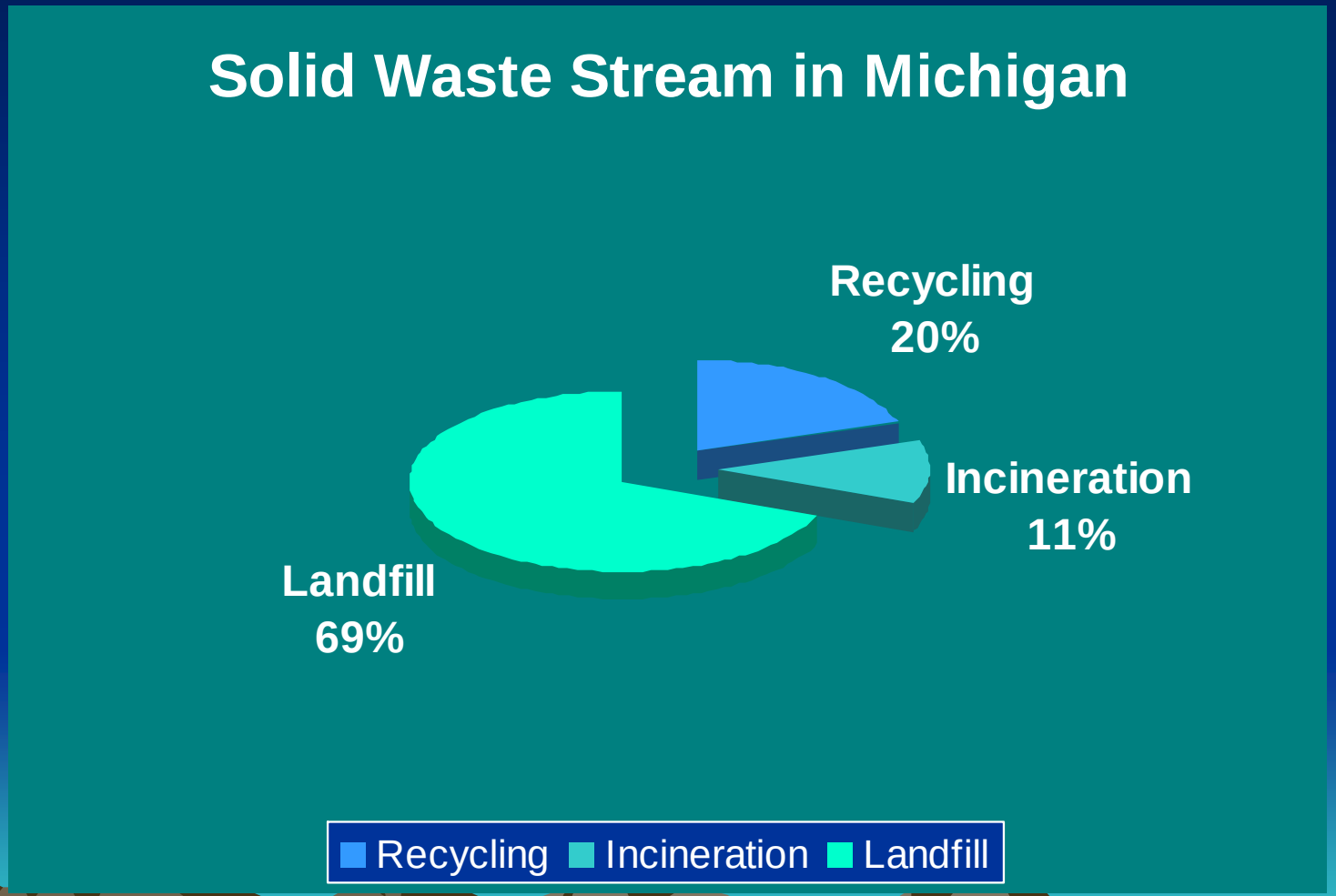
Waste Utilization

- Using waste, site or source separated materials, or other approved material for beneficial purposes
  - reuse
  - recycling
  - composting
  - energy recovery
  - biogasification
  - etc.

Municipal Solid Waste

Where We Are Today

1999 Data Collection by Michigan Recycling Coalition



Recycling rate Includes yard clippings, and about a 95% recovery rate for beverage containers covered by the bottle deposit law.

Michigan Recycling Partnership
(2006)

- Michigan's recycling rate of 20 percent is lower than the other Great Lakes states (30 percent) and the U.S. (27 percent) averages.
- Michigan's recycling program is funded at a fraction of the level of other Great Lakes state programs and ranks 41st out of 48 states that reported their allocations for recycling.
- Only 37 percent of Michigan residents have access to curbside recycling, the lowest percentage of all the states in the region.
- Unlike many states, Michigan does not collect or require reporting of MSW recycling data; therefore, Michigan does not have the ability to measure the state's recycling performance or its handling, collection, transport, and marketing of recyclable materials.

SOLID WASTE DISPOSED IN MICHIGAN LANDFILLS

(All Figures in Cubic Yards)

Fiscal Year	Michigan	Canada	Other States	Totals
FY 2002	45,330,685	6,607,856	4,886,587	56,825,128
FY 2003	46,488,424	9,433,028	6,079,367	62,000,819
FY 2004	45,674,375	11,558,899	6,580,238	63,813,512
FY 2005	45,507,303	11,878,091	6,539,722	63,925,116
FY 2006	42,467,777	12,084,907	6,950,645	61,503,329
FY 2007	40,233,222	10,982,984	6,171,862	57,388,068
FY 2008	39,913,636	10,722,164	6,484,096	57,119,896
FY 2009	34,751,365	9,054,371	4,031,983	47,837,719
FY 2010	34,802,865	8,757,014	2,563,056	46,122,935
FY 2011	35,857,898	6,983,127	2,886,976	45,728,001

Industrial By-Products

- Coal ash
- Shingles
- Foundry sand
- Paper mill sludge
- Scrap wood
- Food processing residuals

So Where Are We in Michigan?

- 2011 Industrial Waste Recycled
  - Coal Ash 310,700 tons
  - Foundry sand 133,900 tons
  - Flue Gas Desulfurization sludge 35,000 tons
  - Pulp and paper sludge 79,500 tons
  - Cement Kiln Dust 25,800 tons
  - Scrap wood 78,200 tons
  - Shingles 34,500 tons
  - Other wastes 94,600 tons
  - **TOTAL 792,400 tons**

Coal Fired Power Plant

Annual Benefits of Using Coal Combustion Products:

Fly ash in concrete =

15.0 million tons used in 2005

FGD Gypsum in wallboard =

8.2 millions tons used in 2005

Saved 158 trillion BTUs of energy ….enough to provide electricity to over 4 million homes for a year.

It also saved 11.2 million tons of CO_2 and 10,500 tons of methane (greenhouse gases) from being emitted into our atmosphere year…..similar to taking 1.9 million cars off the road for a year.

FOUNDRY SAND

Foundry Sand Uses

- Hot mix asphalt (HMA)
- Concrete
- Bases and sub-bases
- Retaining walls
- Soil blends

Foundry Sands

- American Foundry Society has set a goal of 50% recycling rate for foundry sand
- EPA has conducted a risk assessment and has determined that the use of green sands from aluminum, iron, and steel foundries poses minimal risk
- National steering workgroup has targeted Michigan as one of the states to investigate the use of foundry sands in the construction industry

Annual benefits of using foundry sand:

Application	Amount used annually
Road base	144,288 tons
Construction fill	1,140,914 tons
Asphalt pavement	494,390 tons
Concrete pavement	303,531 tons
Manufactured soils	220,949 tons

- 212 billion BTUs of energy saved per year
  - Enough to provide electricity to over 5,500 houses for a year.
- Over 20,000 tons of CO2 emissions prevented
  - Equivalent to taking 3,382 cars off the road for a year.

COMPOST

Registered Composting Sites

(2011 data)

- 120 registered sites
- 1.4 million cubic yards brought to sites
- 720,000 cubic yards removed
- 1.3 million yards on site at end of year
- 5 sites have over 50,000 cubic yards
- 30 sites have less that 1,000 cubic yards
- Accounts for 20% of Michigan’s recycling rate

SHINGLES

Shingles Before Processing

Shingle Processing Equipment

History of Shingle Recycling in Michigan

- 2005 – Barrett Paving approved to use factory rejects in hot mix asphalt (HMA)
- 2007 – Generic exemption allows use in HMA
- 2010 – Generic exemption amended to allow the burning of shingles. MDOT issues “permissive spec” to use shingles on bike path and a small park and ride.
- 2011 – 14 sites recycle 34,500 tons

PAPER MILL SLUDGE

Other Material That Can Be Used In Construction

- Cement kiln dust - for soil stabilization and pH adjustment
- Concrete grinding slurry - for pH adjustment
- Drywall - for soil additive and soil blends
- Tires - in Rubber Modified Asphalt
- Compost – storm water management and soil blends
- Glass – in sub-bases and Glassphalt
- Dredge material – for fill, sub-bases, soil blends

Generic Exemptions Issued

- Drywall (2003)
- Concrete grinding slurry (2003)
- Tires (Updated 2004)
- Water softening limes (Updated 2005)
- Shingles (Updated 2010)
- Scrap Wood (Updated 2010)

Recent MDOT Changes

- 2010 – Permissive spec issued to allow for the use of shingles in HMA
- 2010 – Special provision developed for pneumatic compost
- 2012 – Prohibition against the use of foundry sands is removed from the Spec Book
- MDOT will construct a park and ride using shingles in the HMA

Interesting Facts????

- Approximately $5,000,000 worth of biosolids were land applied in Michigan in 2010
- 300,000 scrap tires were cleaned up last year in Michigan using scrap tire cleanup funds
- 23,166 pounds of pharmaceutical wastes were collected in 2010

Material	Recycled	Disposed	Percent Recycled	Percent Volume Change from 2010	GHG Reductions ($MTCO_2E$ / Number of Cars)	Energy Savings (MBTU/Number of Households Annual Energy Needs)
Pulp/paper/wood sludge	79,491	252,000	25%+	+14%		
Shingles	34,500	?	?	+102%	5,406/990	127,386/1,188
Scrap Wood	78,235	?	?	+43%	-4,205/-770	660,874/6,161
CKD	25,829	268,300	9%	-25%		
Foundry Sand	133,917	372,000	26%	-11%		
Food Processing	44,366	?	?	+233%		
Coal Ash[2]	310,670	1,374,000	18%	+4%	281,613/51,579	1,632,855/15,233
Drywall	1,278	?	?	+128%	121/22	4,060/28
FGD	34,949	?	?	+17%		
Wood Ash[1]	2,367	125,000	2%	-2%		
Totals[3]	792,435	?	?	+18%	283,000/51,800	2,425,175/22,610

Additional Information

- DEQ website at www.Michigan.Gov/DEQ click waste, then Solid Waste, then Exemption and Guidance
- ShingleRecycling.Org
- Dredge material locator - http://www.glc.org/rsm/
- Foundry sand information - http://www.afsinc.org/content/view/791/264/
- Recycled Materials Resource Center - http://www.recycledmaterials.org/
- Foundry Sand Facts for Civil Engineers (FHWA) - http://isddc.dot.gov/OLPFiles/FHWA/011435.pdf

Contact Information

Duane Roskoskey, P.E.
Department of Environmental Quality
Resource Management Division
RoskoskeyD@Michigan.Gov
517-335-4712